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is made moveable so as vehicles ride over it the resulting kinetic energy may be converted into electrical energy. Introducing moving parts into a structure subject to the elements makes that structure more impractical.

Reference is also made to my Disclosure Document #545543.

GENERAL SUMMARY

A live load is defined in this invention as any load causing variation in pressure through time on the walls of a reservoir of working fluid. There are many causes of live loads and the energy of them can be converted into electrical energy using a Bourdon tube. Changes in structure are needed for each type of cause. This invention is concerned with describing these various structures.

Basically the invention is a reservoir of working fluid impacted by a live load, a Bourdon tube, certain gearing and a D.C. generator, all operatively connected. The relatively inelastic walls of the reservoir are pressed upon by various causes. The working fluid may be compressed and decompressed ~~or spun~~ to create pressure variations in the Bourdon tube. The Bourdon tube is made to act on the gearing so as to activate the generator.

The aim of the invention is to convert pressure energy to electrical energy yet not impair the integrity of the supporting structure by introducing moving parts, nor use heat to produce the needed pressure. Heat can be more effectively be conveeted into pressure energy in other ways well known.

FIG.12 shows how a ship may be used with the invention to produce electricity.

FIG.12a shows more particularly a perspective view of a ship's propeller and the structure of the invention near it.

Fig. 13 shows how a railcar's shock absorber may be used with the invention to produce electricity.

~~FIG.14 shows how a spinning tire may be used with the invention to produce electricity.~~

FIG. 15 is a perspective view of a device to convert the energy of wind and subsurface ocean currents into electricity using the present invention.

opposite direction from ratchet 19 and pawl 10 operatively attached to gear 25. Axially attached to driveshaft 25 is gear 29 which is located to mesh with gear 23 which is axially attached to shaft 26. ~~The working fluid for Bourdon tube 11 is water except for the twelfth preferred embodiment where it is air.~~

Fixedly attached to support 15 is chamber 13 which encloses Bourdon tube 11. Chamber 13 is attached to a face of gear 12 by a slideable seal 13a so as gear 12 is made to revolve the working fluid within chamber 13 will be retained. Entry tube 5 is located to supply pressure to the working fluid within chamber 13.

In operation pressure variations on the working fluid in Bourdon tube 11 and chamber 13 cause gear 12 to be rotated back and forth. Due to the action of the aforementioned gears 12,17,23,29 and ratchets 19,21 and pawls 10 ,22 driveshaft 26 is made to rotate in only one direction regardless of the direction gear 12 is made to rotate. Driveshaft 26 thus is made to operate generator 27.

Turning to FIG.3 we see the apparatus of Fig. 2 modified for a C-type Bourdon tube 28. On the moveable end of Bourdon tube 28 is a rod which is made to fit into Scotch Yoke 24 fixedly attached to gear 12. Regardless of which type of Bourdon tube is used if it is desired to increase the force on gear 12 then a plurality of Bourdon tubes can be attached to gear 12. A possible arrangement is shown in U.S. Patent 1,258,368.

FIG.13 we see railcar 51 with the apparatus of FIGS. 1, 2. In particular the machinery of FIG. 1(shown schematically) has its shafts 3,4 connected to shock absorbers 55 which in their turn are connected to a railcar 51 and also to a succeeding railcar 51.

Eleventh Preferred Embodiment.

Live loads on suspension bridge roadways cause the stress on the suspension cables of the bridge to vary. By inserting the reservoir structure described in the third preferred embodiment between two sections of a cable vertically so one section of the cable will pull the piston shaft and the other section will pull the piston cylinder the invention will be activated. The added vertical motion of the cable when subject to an added load will be very small.

FIG.10 shows a bridge 50 suspended by cable 52 from suspension cable 51. A second cable 66 is attached to cable 52 at cable 52 top 53 and bottom 54 so as cable 52 is stretched cable 66 is stretched also. Cable 66 is divided into two sections united by the conversion machinery of FIG.1 uniting the two sections.

In operation as cable 66 is stretched and alternately relaxed by the passage of live loads on bridge 50 The conversion machinery of the invention is activated, producing electrical energy. FIG.1 is shown schematically in Fig. 10.

~~Twelfth Preferred Embodiment.~~

~~This concerns auxiliary power generated by a vehicle's air-inflated tires. When a tire is made to revolve on its wheel~~

the air in the tire spins also due to friction with the inner walls. Also the air will be forced to the tread wall due to inertia. Therefor there will be a pressure differential with higher pressure at the treadwall (which is the outer circumference of the air compartment)and the wheel wall (which is the inner circumference of the air compartment)For this embodiment two concentric tubes are led through a hole in the middle of the axle from the first gear of a transmission, through the driveshaft, bending 90 degrees at the differential, the first tube terminating just inside the inner circumference of the air compartment so as the tire is made to spin air is drawn out of the tube and lowering the pressure therein.

The second tube is led to the outer circumference of the air compartment and bent in the direction of the tire spin when the vehicle is made to move forward. This second tube terminates on the one hand at the aforementioned outer circumference and on the other end inside the C-type Bourdon tube. The first tube is made to terminate in the chamber surrounding the Bourdon tube. This second tube is made to terminate inside the air cushion so it is fixed in one position as the tire is made to spin. in this way air is forced into the second tube increasing the pressure therein.

In this way the Bourdon tube is made to operate with the maximum pressure differential. Thus the invention is activated when the vehicle is made to accellerate or decellerate. This embodiment is particularly useful to recover energy from operating electric cars.

In FIG.14 we see a vehicle tire 60 mounted on a wheel ridged 85 on its outer perimeter 55 and axle 56.Through the center of axle 56 concentrically is a hole containing two tubes 58,59. Tube 58 is made to terminate inside the air container of tire 60 near the wheel's outer perimeter. Tube 59 is made to terminate near the outer perimeter of the air pocket underneath the tread.Thrust bearings 69,79 mounted around wheel 55 with ball bearings 68,78 are sealed against air pressure.Only the section of tube 59 distal to revolveable seal 61 revolves with wheel 55. From holes in the bottom of thrust bearings 69,79 hang tubes formed as tubes 59,69 respectively. Weights 70,70a are fixedly attached to tubes 59,60 The concentric tubes 80,81 on the other side of revolveable seal 61 are led through differential 82 turned 90 degrees, through drive shaft 83 and the center of transmission gear 84 where they become tubes 5,6.

In operation as tire 54 is made to spin weighted tubed 60,67 remain in the same position so ~~pressure~~ within tubes 6,59,67 and tube 16 as well as Bourdon tube 11 is increased so more energy can be recovered.

16.

~~Thirteenth~~ Twelfth Preferred Embodiment.

Wind and subsurface ocean currents, if their velocities are plotted on a second-by-second basis show many variations. For example we observe wind blows in small and large gusts. This produces pressure variations on whatever solid surface these fluids strike. This embodiment shows how these variations may be converted into electrical energy.

Here is shown how to integrate the invention into prior art exhibited in U.S. Patent Application#10/742,983.which concerns the energy of the wind and subsurface ocean currents. In the prior art there is a teardrop-shaped object elevated into the midst of a fluid current. The object is oriented so its blunt end is is made to face the oncoming current. The object is in two separate portions , the division being on a plane through the object's widest diameter called an anterior dome and either a posterior cone or a posterior dome. There is sufficient structure to unite the the separated parts of the hollow object together. Through the ~~center of~~ center of the anterior dome shaped portion is a hole. As fluid flows past this teardrop shaped object fluid tends to be drawn through this hole at high velocity and out between the rims of the anterior and posterior portions of the object at the prevailing current velocity. A cone shaped object is placed just inside the anterior portion near the hole so fluid entering the hole will be deflected by the cone. The cone is operably attached to the piston shaft of the structure described in FIG.1